北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Special Seminar

Unconventional magnetism

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Time: 2:30 pm, Mar.27, 2025 (Thursday)

时间：2025年3月27日（周四）下午2:30

Venue: Room w563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

With the advancement of antiferromagnetic (AFM) spintronics, magnetic materials with diverse magnetic structures have garnered widespread attention. Of particular interest are “unconventional magnets”, which simultaneously exhibit AFM configurations while displaying properties reminiscent of ferromagnets (FMs). Thus, unconventional magnets promise to combine the advantages of both FM and AFM materials, offering, e.g., high storage capacity, low power consumption, electrical manipulation, and ultrafast dynamics. In this talk, we start with symmetry theory describing magnetic geometry—spin group theory [1,2] —to discuss the symmetry design strategies and material pools for different facets of unconventional magnets, including spin splitting, anomalous Hall effect, multiferroicity, and topological magnons [3-6]. We also introduce a homemade online program, FINDSPINGROUP (https://findspingroup.com/), which is applied to diagnose the symmetry classification of magnetic materials and related properties.

References

[1] P. Liu, …, X. Wan* and **QL***, Phys. Rev. X 12, 021016 (2022).
[2] X. Chen, …, **QL***, Phys. Rev. X 14, 031038 (2024).
[3] X. Chen, …, **QL***, arXiv:2307.12366 Nature (2025).
[4] Y. Zhu, …, S. Qiao*, **QL*** and C. Liu*, Nature 626, 523 (2024).
[5] M. Gu, …, A. Stroppa* and **QL***, Phys. Rev. Lett. 134, 106802 (2025).
[6] **QL*** et al. Nat. Phys. 21, 329 (2025).

About the speaker

刘奇航，南方科技大学教授，本科及博士均毕业于北京大学物理学院，曾在美国西北大学、科罗拉多大学博尔德分校进行博士后研究。主要从事计算凝聚态物理研究，研究兴趣聚焦于量子材料中的对称性新理论与新效应。发表SCI论文100余篇，H指数42。2018年作为独立PI后发表通讯作者文章包括2篇Nature、1篇Nat. Phys.、15篇PRL/PRX、4篇Nat. Commun.、3篇Natl. Sci. Rev.等。2020年作为项目负责人获批国家重点研发计划青年项目，2022年获批深圳市杰青项目，2023年获广东省青年科技创新奖，2021至2024年连续入选斯坦福大学发布的全球前2%顶尖科学家榜单（World’s Top 2% Scientists）。2024年起担任npj Quantum Materials副编辑。